MCR12LD, MCR12LM, MCR12LN

Preferred Device

Silicon Controlled Rectifiers

Reverse Blocking Thyristors

Designed primarily for half–wave ac control applications, such as motor controls, heating controls, and power supplies; or wherever half–wave, silicon gate–controlled devices are needed.

- Blocking Voltage to 800 Volts
- On–State Current Rating of 12 Amperes RMS at 80°C
- High Surge Current Capability — 100 Amperes
- Rugged, Economical TO–220AB Package
- Glass Passivated Junctions for Reliability and Uniformity
- Minimum and Maximum Values of IGT, VGT and IH Specified for Ease of Design
- High Immunity to dv/dt — 100 V/µsec Minimum at 125°C
- Device Marking: Logo, Device Type, e.g., MCR12LD, Date Code

MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

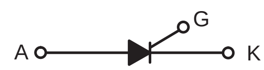
Rating	Symbol	Value	Unit
Peak Repetitive Off–State Voltage(1) (T_J = –40 to 125°C, Sine Wave, 50 to 60 Hz, Gate Open) MCR12LD MCR12LM MCR12LN	V_{DRM}, V_{RRM}	 400 600 800	Volts
On-State RMS Current (180° Conduction Angles; T_C = 80°C)	$I_{T(RMS)}$	12	A
Peak Non-repetitive Surge Current (1/2 Cycle, Sine Wave 60 Hz, T_J = 125°C)	I_{TSM}	100	A
Circuit Fusing Consideration (t = 8.3 ms)	I^2t	41	A^2sec
Forward Peak Gate Power (Pulse Width ≤ 1.0 µs, T_C = 80°C)	P_{GM}	5.0	Watts
Forward Average Gate Power (t = 8.3 ms, T_C = 80°C)	$P_{G(AV)}$	0.5	Watt
Forward Peak Gate Current (Pulse Width ≤ 1.0 µs, T_C = 80°C)	I_{GM}	2.0	A
Operating Junction Temperature Range	T_J	–40 to 125	°C
Storage Temperature Range	T_{stg}	–40 to 150	°C

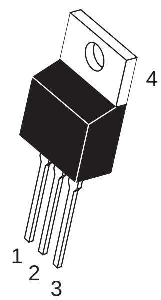
(1) V_{DRM} and V_{RRM} for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.

ON Semiconductor

http://onsemi.com

SCRs
12 AMPERES RMS
400 thru 800 VOLTS





TO–220AB
CASE 221A
STYLE 3

PIN ASSIGNMENT	
1	Cathode
2	Anode
3	Gate
4	Anode

ORDERING INFORMATION

Device	Package	Shipping
MCR12LD	TO220AB	50 Units/Rail
MCR12LM	TO220AB	50 Units/Rail
MCR12LN	TO220AB	50 Units/Rail

Preferred devices are recommended choices for future use and best overall value.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Value	Unit
Thermal Resistance — Junction to Case — Junction to Ambient	$R_{\theta JC}$ $R_{\theta JA}$	2.2 62.5	°C/W
Maximum Lead Temperature for Soldering Purposes 1/8″ from Case for 10 Seconds	T_L	260	°C

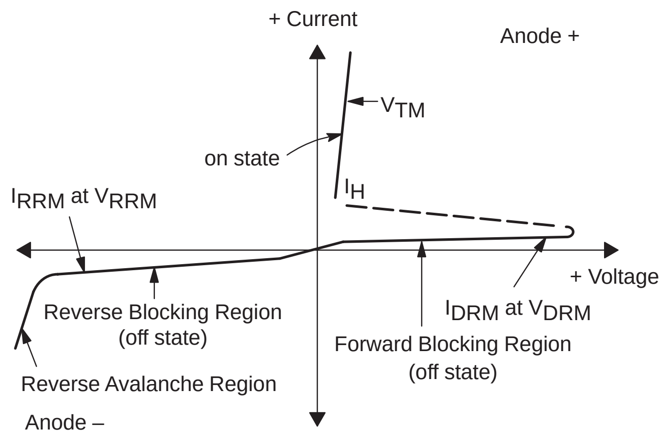
ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Peak Repetitive Forward or Reverse Blocking Current (V_D = Rated V_{DRM} and V_{RRM}; Gate Open) T_J = 25°C T_J = 125°C	I_{DRM}, I_{RRM}	— —	— —	0.01 2.0	mA
ON CHARACTERISTICS					
Peak Forward On–State Voltage* (I_{TM} = 24 A)	V_{TM}	—	—	2.2	Volts
Gate Trigger Current (Continuous dc) (V_D = 12 V, R_L = 100 Ω)	I_{GT}	2.0	4.0	8.0	mA
Holding Current (V_D = 12 V, Gate Open, Initiating Current = 200 mA)	I_H	4.0	10	20	mA
Latch Current (V_D = 12 V, Ig = 20 mA)	I_L	6.0	12	30	mA
Gate Trigger Voltage (Continuous dc) (V_D = 12 V, R_L = 100 Ω)	V_{GT}	0.5	0.65	0.8	Volts
DYNAMIC CHARACTERISTICS					
Critical Rate of Rise of Off–State Voltage (V_D = Rated V_{DRM}, Exponential Waveform, Gate Open, T_J = 125°C)	dv/dt	100	250	—	V/µs
Critical Rate of Rise of On–State Current IPK = 50 A; Pw = 40 µsec; diG/dt = 1 A/µsec, Igt = 50 mA	di/dt	—	—	50	A/µs

*Indicates Pulse Test: Pulse Width ≤ 1.0 ms, Duty Cycle ≤ 2%.

Voltage Current Characteristic of SCR

Symbol	Parameter
V_{DRM}	Peak Repetitive Off State Forward Voltage
I_{DRM}	Peak Forward Blocking Current
V_{RRM}	Peak Repetitive Off State Reverse Voltage
I_{RRM}	Peak Reverse Blocking Current
V_{TM}	Peak On State Voltage
I_H	Holding Current



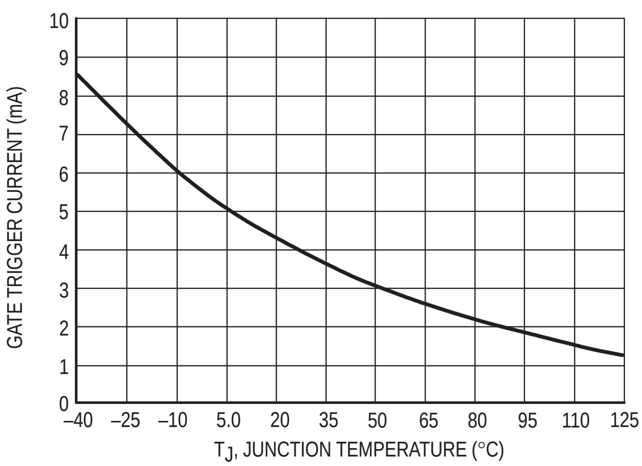


Figure 1. Typical Gate Trigger Current versus Junction Temperature

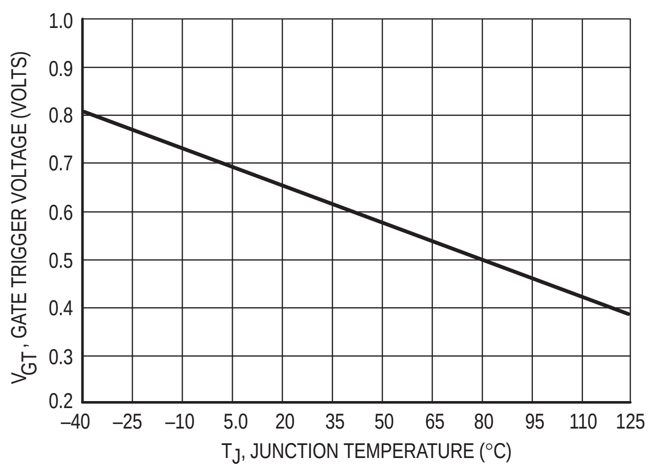


Figure 2. Typical Gate Trigger Voltage versus Junction Temperature

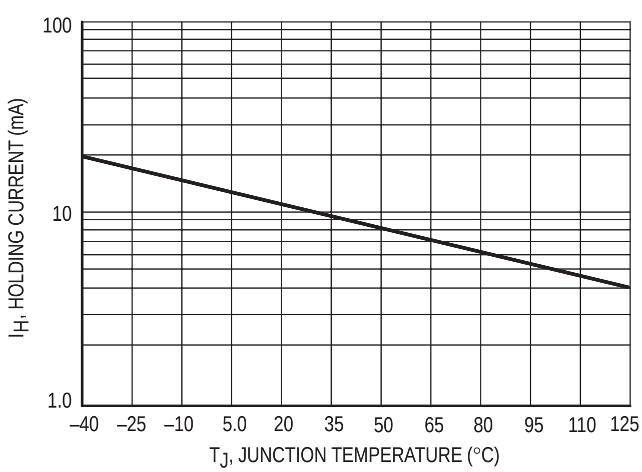


Figure 3. Typical Holding Current versus Junction Temperature

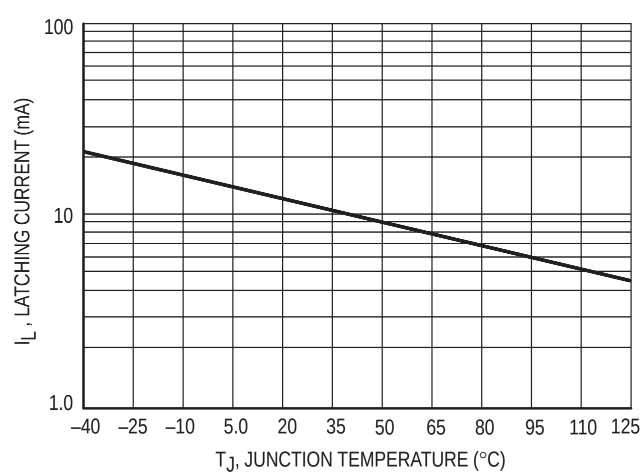


Figure 4. Typical Latching Current versus Junction Temperature

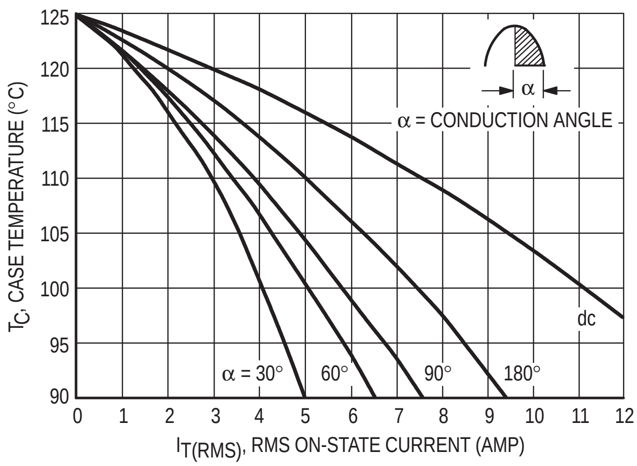


Figure 5. Typical RMS Current Derating

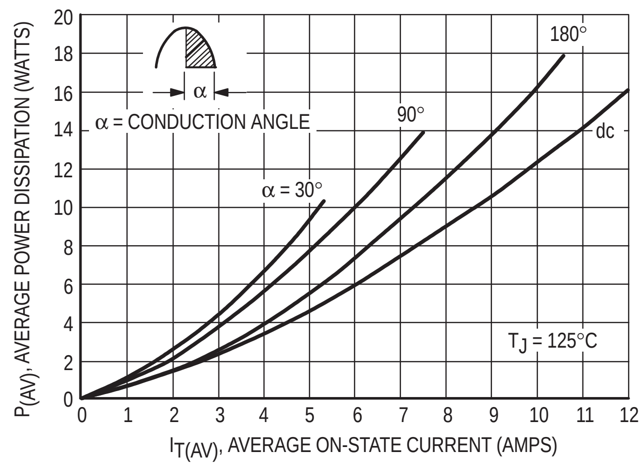


Figure 6. On–State Power Dissipation

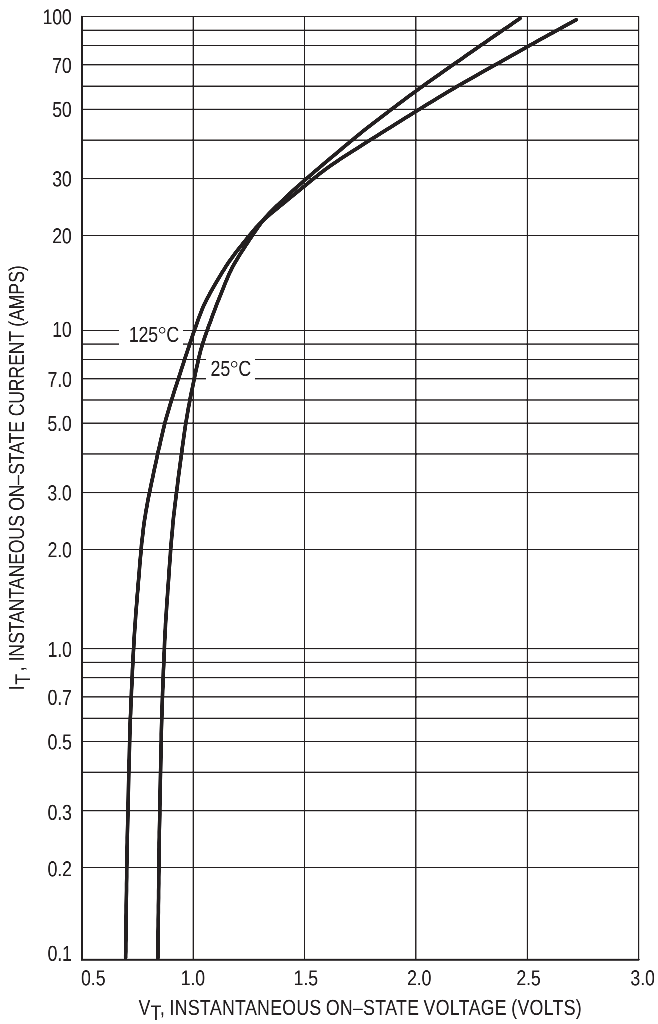
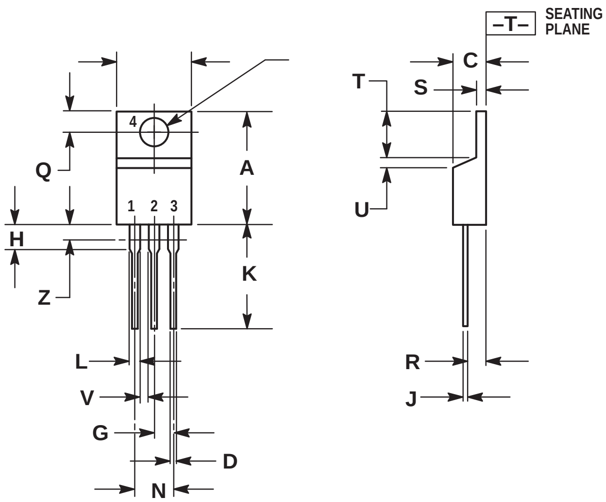


Figure 7. Typical On–State Characteristics

PACKAGE DIMENSIONS

TO–220AB
CASE 221A–09
ISSUE Z



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

	INCHES		MILLIMETERS	
DIM	**MIN**	**MAX**	**MIN**	**MAX**
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.018	0.025	0.46	0.64
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	——	1.15	——
Z	——	0.080	——	2.04

STYLE 3:
PIN 1. CATHODE
2. ANODE
3. GATE
4. ANODE

Notes

Notes

PUBLICATION ORDERING INFORMATION

NORTH AMERICA Literature Fulfillment:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303–675–2175 or 800–344–3860 Toll Free USA/Canada
Fax: 303–675–2176 or 800–344–3867 Toll Free USA/Canada
Email: ONlit@hibbertco.com
Fax Response Line: 303–675–2167 or 800–344–3810 Toll Free USA/Canada

N. American Technical Support: 800–282–9855 Toll Free USA/Canada

EUROPE: LDC for ON Semiconductor – European Support
German **Phone**: (+1) 303–308–7140 (M–F 1:00pm to 5:00pm Munich Time)
Email: ONlit–german@hibbertco.com
French **Phone**: (+1) 303–308–7141 (M–F 1:00pm to 5:00pm Toulouse Time)
Email: ONlit–french@hibbertco.com
English **Phone**: (+1) 303–308–7142 (M–F 12:00pm to 5:00pm UK Time)
Email: ONlit@hibbertco.com

EUROPEAN TOLL–FREE ACCESS*: 00–800–4422–3781
*Available from Germany, France, Italy, England, Ireland

CENTRAL/SOUTH AMERICA:
Spanish Phone: 303–308–7143 (Mon–Fri 8:00am to 5:00pm MST)
Email: ONlit–spanish@hibbertco.com

ASIA/PACIFIC: LDC for ON Semiconductor – Asia Support
Phone: 303–675–2121 (Tue–Fri 9:00am to 1:00pm, Hong Kong Time)
Toll Free from Hong Kong & Singapore:
001–800–4422–3781
Email: ONlit–asia@hibbertco.com

JAPAN: ON Semiconductor, Japan Customer Focus Center
4–32–1 Nishi–Gotanda, Shinagawa–ku, Tokyo, Japan 141–8549
Phone: 81–3–5740–2745
Email: r14525@onsemi.com

ON Semiconductor Website: http://onsemi.com

For additional information, please contact your local
Sales Representative.